C. P. BEACH.

APPARATUS FOR RENDERING WORN BUSHINGS USABLE.

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1,347,490. Patented July 27, 1920.

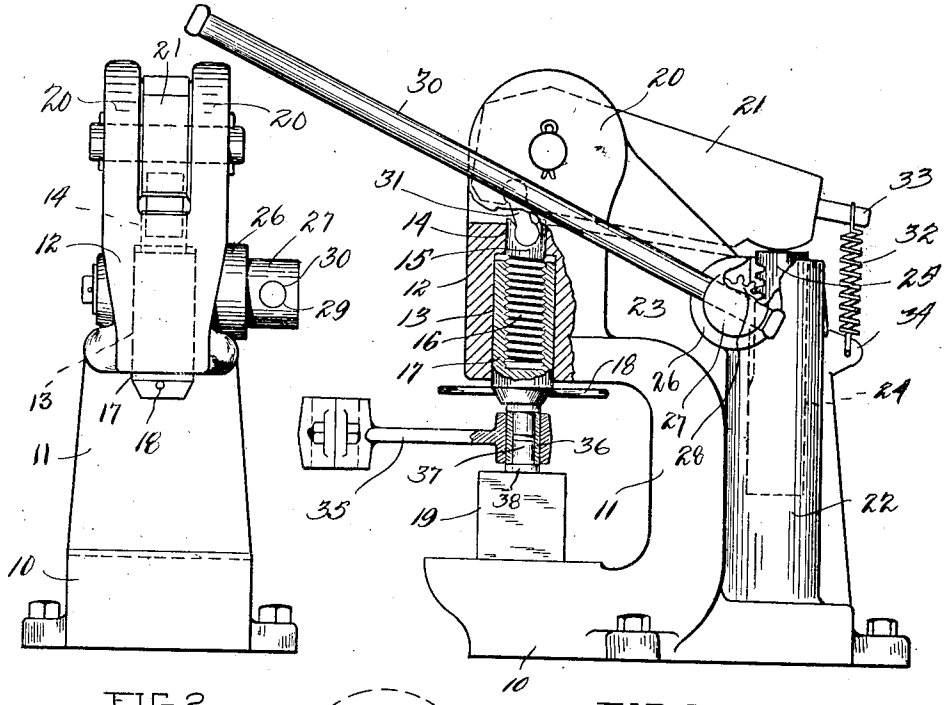


FIG. 2.

FIG. 1.

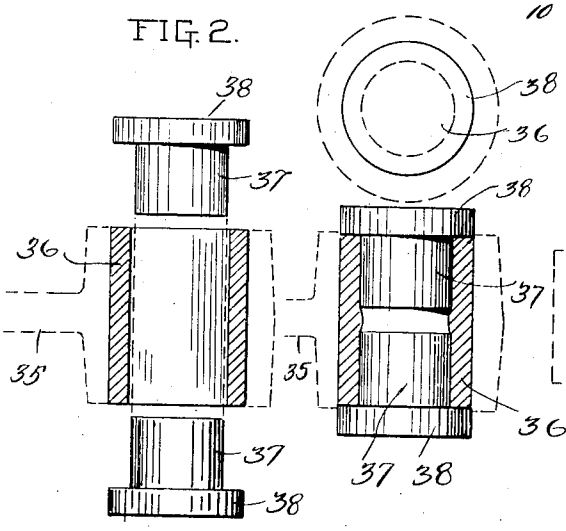


FIG. 3.

FIG. 4.

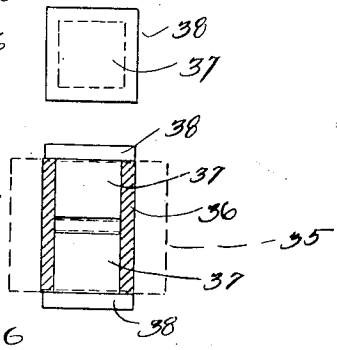


FIG. 5.

WITNESSES

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APPARATUS FOR RENDERING WORN BUSHINGS USABLE.

1,347,490. Specification of Letters Patent. Patented July 27, 1920.

Application filed June 16, 1916, Serial No. 104,056. Renewed January 9, 1919. Serial No. 270,443.

To all whom it may concern:

Be it known that I, CHARLES P. BEACH, a citizen of the United States, residing at Littleton, in the county of Grafton, State of New Hampshire, have invented certain new and useful Improvements in Apparatus for Rendering Worn Bushings Usable; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an apparatus for rendering worn bushings usable, the object of the invention being to provide apparatus of the character specified which shall be simple, certain, and efficient in operation, and which shall economically and expeditiously treat worn bushings to reduce the bore of the bushing to less than the desired size to permit subsequent reboring and continued use of the bushings.

By way of example, I have shown the preferred embodiment of my invention in the accompanying drawing, where:—

Figure 1 is a side elevation of an apparatus constructed in accordance with the invention shown partly in section and partly broken away;

Fig. 2 is a front view of the apparatus;

Fig. 3 is a longitudinal section through the worn bushing of a connecting rod with the compression pins in position ready to be inserted previous to operating on the bushing through the medium of the improved apparatus;

Fig. 4 is a view similar to Fig. 3 showing the status of the bushing with respect to the compression pins after the bushing has been compressed, and

Fig. 5 is a view similar to Fig. 4 disclosing a square bushing and square compression pins.

Referring to the drawings the apparatus embodied in the invention is shown as comprising a base 10 from which rises a standard 11. The upper end of this standard terminates in a forwardly disposed offset portion 12 having a vertical passage 13 therein, the upper end of said passage terminating in a reduced portion 14 in which is slidably engaged the head 15 of a screw 16. Threaded on the screw 16 and disposed within the passage 13 is a pressing nut 17 having handle portions 18 whereby the nut may be easily rotated to adjust it on the screw 16. Mounted on the base 10 in line with the pressing nut 17 is a block or anvil 19. The upper end of the offset portion 12 of the standard terminates in spaced ears 20 between which is pivoted a pressing lever 21. Rising from the base 10 is a column 22 the lower portion of which abuts the standard 11 while the upper portion is connected to the standard and the offset portion 12 by a web 23. This column 22 is provided with a recess 24 opening through the upper end thereof and in this recess is slidably mounted a rack 25 the upper end of which coöperates with the adjacent end of the lever 21. Rotatably mounted in a suitable bearing 26 carried by the column 22 and web 23 is a shaft 27 on which is fixed a pinion 28 coöperating with the rack 25. The shaft 27 is provided with a transverse passage 29 in which is slidably engaged a handle 30 whereby the shaft 27 may be manually rotated to raise the rack 25. The pressing lever 21 is connected to the screw head 15 by a link 31. This pressing lever 21 is normally held in engagement with the upper end of the rack 25 by means of a spring 32 one end of which is secured to an extension 33 of said lever while the other end thereof is anchored to an ear 34 formed on the column 22.

In Fig. 1 the apparatus is shown in the act of compressing the bushing of a connecting rod of an explosive engine, such connecting rod being indicated at 35 and the bushing at 36. Before compressing the bushing 36 to permit reboring thereof to the desired diameter there is inserted in each end of the bushing a compressing pin 37 of a diameter slightly less than the desired diameter of the bore of the bushing. Each compressing pin 37 is provided with a flange 38 at its outer end which rests upon the adjacent end of the bushing. When these pins 37 have been inserted in the bushing as shown in Fig. 1 with the outer end of the pins engaged by the nut 17 and the anvil 19 respectively the handle 30 is pushed down to rotate the shaft 27 and this shaft acting through the pinion 28 will raise the rack 25 and lift the adjacent end of the lever 21 with great power. This movement of the lever is transmitted through its opposite end and through the link 31 to force the screw 16 and nut 17 downwardly to effect the desired compression of the bushing 36. By reference to Fig. 4 it will be seen that this compression of the bushing will cause the

metal thereof to flow so that the end portions of the bore of the bushing will conform in diameter to the diameters of the compressing pins and as the diameters of these pins are less than the desired diameter it will be obvious that the bushing can be rebored and used the same as a new bushing. While compression of the bushing will slightly decrease the length of same this in no way results in an objectionable condition.

It will be noted that, in the embodiment of the invention here shown for purposes of illustration only each of the compression studs or pins 37 consists of a rigid filler for the bore of the bushing of smaller diameter than the diameter of such bore, the flange 38 of such pin or stud serving as an end abutment to assist in the longitudinal compression of the bushing. Moreover, the bearing in the connection rod which surrounds the bushing acts as a die to determine the outside diameter of the bushing during the longitudinal compression thereof, although, as is obvious, any suitable die may be used for this purpose. When a separate die is used, the re-formed bushing may be removed therefrom in any suitable manner such as by forcing it longitudinally out of the die. The particular means of removal, however, forms no part of my invention.

While one particular form of carrying the invention into practice has been illustrated and described it will be obvious that various changes may be resorted to without departing from the scope of the invention as set forth in the appended claims.

What is claimed is:—

1. An apparatus for fitting bushings consisting of a frame, a pressing member slidable in the frame, an anvil mounted on the frame beneath the pressing member, a vertically movable rack mounted on the frame a shaft rotatably mounted on the frame, a pinion on said shaft coöperating with the rack, means for rotating the shaft, a pressing lever pivoted on the frame, and having one end in engagement with the upper end of the rack, and connections between the other end of the lever and the pressing member.

2. An apparatus for fitting bushings comprising a stationary die arranged to surround and contain the bushing, two fillers each of which comprises a pin which is arranged to enter the bore of the bushing and is of a size no greater than the desired bore and also a flange which is arranged to overlie one end of the bushing and is of such size that it may enter within the die, and means to produce relative approachment of said fillers to thus cause the bearing to flow into a shorter form having a reduced bore.

3. An apparatus for fitting bushings comprising a stationary die arranged to surround and contain the bushing, two fillers each of which comprises a pin which is arranged to enter the bore of the bushing and is of a size no greater than the desired bore and also a flange which is arranged to overlie one end of the bushing and is of such size that it may enter within the die, a base supporting one of said fillers, a movable pressing member mounted on said base and engaging the second filler, and means for operating said pressing member to move said second filler toward said first filler to thus cause the bearing to flow into a shorter form having a reduced bore.

4. An apparatus for fitting bushings comprising a stationary die arranged to surround and contain the bushing, two fillers each of which comprises a pin which is arranged to enter the bore of the bushing and is of a size no greater than the desired bore and also a flange which is arranged to overlie one end of the bushing and is of such size that it may enter within the die, a base supporting one of said fillers, a standard supported by said base, a reciprocable plunger mounted in said standard and engaging the second filler, and means for operating said plunger to move said second filler toward said first filler to thus cause the bearing to flow into a shorter form having a reduced bore.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES P. BEACH.

Witnesses:
RAY C. BAILEY,
EUGENE J. BYRON.